



SPACE CENTER

Roundup

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HELLO, 2003!

NASA JSC S109E5606

STS-109 Mission Specialist Mike Massimino waves to crewmates on the other side of the aft flight deck windows on Space Shuttle *Columbia*, while standing on the end of the Remote Manipulator System arm in the shuttle's cargo bay. During this March 5 spacewalk, Massimino and Mission Specialist Jim Newman replaced the port solar array on the Hubble Space Telescope, partially visible in the background. STS-109 was just one of many events in a busy, successful year. **Read more in the 2002 Year in Review on pages 4 and 5.**

'A New Age of Opportunity'

By Mike Mott, Vice President & General Manager, NASA Systems, The Boeing Company

In the spirit of One NASA, the guest columnist section will now provide messages from both JSC management and JSC contractor leadership. Columns from the contractor community will be featured throughout the year.



America's space program does great things – it goes beyond the known and explores the unknown. It offers the next generation hope, inspiration and opportunity. The NASA vision, "to improve life here; to extend life there; and, to find life beyond," and its mission, "to understand and protect our home planet, to explore the universe and search for life, to inspire the next generation of explorers...as only NASA can," will build upon this great legacy.

Together NASA, Johnson Space Center and the industry team just completed another

hall of fame year: five highly successful space shuttle missions, including deployment of the International Space Station truss segments, installation of the mobile transporter, continued human presence in space for over two years, and a Hubble Space Telescope servicing mission.

One of the reasons ISS is so critically important is that it establishes the basis for broad-sweeping international partnerships needed to tackle future human space missions consistent with NASA Administrator Sean O'Keefe's vision. It is also another reason why world-class science that engages all the ISS international partners and leverages their investment in ISS must be retained as a key program objective.

ISS international cooperation is breaking down the barriers we have to overcome to push back the space frontier. We sometimes forget the significance of this achievement. It will take 88 missions to space to assemble and outfit ISS, launching 100 major components on NASA's space shuttle and Russian launch vehicles. This is a truly global project involving the scientific and technological resources of 16 countries and the efforts of more than 100,000 people throughout the world in the largest peacetime joint effort in history.

Think about it – on the first assembly mission, two pieces of flight hardware that had never been closer together than 10,000 miles on Earth rendezvous and dock 250 miles in orbit. Then the light switch is turned on and it works. This is a real credit to NASA's leadership, the international partners and the contractors working on this historic program.

Consider the space shuttle – 20 years old and going strong. What a fantastic flying machine: a human-rated rocket ship for eight and a half minutes; a spacecraft for up to two weeks capable of rendezvous, docking and assembling large structures, supporting space walks, satellite retrieval and repair, and just about any other mission imaginable; then a hypersonic reentry vehicle for about an hour; and finally a piloted glider for five minutes. Now, that is impressive, and we make it look easy.

Hardware and software systems and technologies – such as the Orbital Space Plane and the Nuclear Systems Initiative – that will bring NASA's vision to life will result from a genuine national commitment that is more focused on achieving results, and less concerned about claiming credit.

We now look to 2003 and the years ahead as the potential start of a new age of opportunity for human space exploration, where the quality of life around the globe can be substantially improved through down-to-earth applications of space-based research and technologies.

To start, there are six space shuttle missions set for 2003 – five of which support ISS. STS-107 is a 16-day science mission using a SPACEHAB module. Future shuttle-ISS missions will support assembly of additional truss segments, carry the Expedition 7 and 8 crews, and include solar array electrical power hardware.

It's an exciting manifest that will require attention to detail to ensure flight safety and mission success. It's only a beginning, however. What is to follow will build on the legacy of the past and open the door to a future of scientific discovery and human exploration beyond low Earth orbit.

Our future is full of tremendous promise and potential. We certainly plan to be right in the thick of things as we are today and have been in the past. We are confident that our colleagues at JSC and NASA will continue to exercise leadership matched by technical brilliance to help chart a future course and secure a rich destiny for our nation and the world in space. We look forward to the journey. ♦

The views expressed in this guest column do not necessarily reflect the policies or views of NASA or JSC Management.



READY! SET! GO!!

A quick glance at 2002 confirms that the JSC team has a lot to be proud of. Your support of five very successful shuttle missions was superb. Ditto for the support of the ISS and its Expedition crews! You continued making advances in biomedical and astromaterial research as well as human-robotic interface. You retained your VPP Star. You helped make the World Space Congress a smashing success. You hosted several important conferences, foreign dignitaries and heads of state. All of this was done in superior fashion (I have the letters of thanks to prove it!) and at a time when you were adjusting to a new NASA Administrator and putting up with a new Center Director. In summary, WELL DONE!

But now I must remind us of the curse of human spaceflight: "You are only as good as you are today!" All the wonderful things you accomplished last year, along with two bucks, will get you a cup of coffee. My point is that we cannot rest on our laurels. We can't look back. We must look forward and be on the top of our game from the get-go.

This year is going to be incredibly challenging for the entire NASA team and JSC in particular. Mr. O'Keefe has declared that we will have the U.S. portion of the ISS core completed during February of 2004. Getting this accomplished as stated will have a significant impact on NASA's future pursuits, budgets and our relations with our national leadership as well as our international partners. The assembly missions scheduled this year will have to go on time and without a hitch, and oh, by the way, they are more complex than any missions we have done in the past.

It's going to take an extraordinary effort by the entire spaceflight team to meet this challenge successfully. We at JSC must lead the way in professional excellence and paying attention to detail. It's going to take every member of the team giving your very best effort as well as your full cooperation with your teammates. I know that you will come through with flying colors just as you have in the past.

LET'S GO FOR IT!!!

“One NASA is an effort to foster greater collaboration across the Agency. It was begun by NASA employees and is fully backed by NASA leadership. One NASA's focus is cultural change. Other ongoing initiatives, such as the Integrated Financial Management Plan and Freedom to Manage, complement One NASA by promoting common business practices.”

– from the One NASA Web site,
www.onenasa.nasa.gov

Page 3 contains a poster to help you familiarize yourself with the One NASA goals of cooperation and communication.

FROM THE DESK OF LT. GEN. JEFFERSON D. HOWELL JR.

ONE NASA

ONE TEAM, OPTIMALLY APPLYING MANY UNIQUE CAPABILITIES TO THE PURSUIT OF ONE SHARED VISION.

WHY ONE NASA?

- * To better utilize the limited, existing talent within the Agency
- * To build on what is unique and “value added” from each Center for the good of the whole
- * To minimize the duplication of effort that takes money from our programs and infrastructure
- * To increase our credibility with the public
- * To increase the level of trust and teamwork within the Agency

ONE NASA IS:

- * Working together: collaboration
- * Working efficiently: standardizations that free up funding for science, research and engineering
- * Being aligned with our vision and mission: doing the things that only NASA can
- * Teamwork and cultural change

ONE NASA IS NOT:

- * Closing facilities or divesting from capabilities
- * Workforce reductions
- * The end of healthy competition for innovative ideas
- * About giving you all the answers

ONE NASA was initiated by the employees of previous developmental classes. NASA’s leadership fully endorses the efforts to date and supports **ONE NASA**. Upcoming activities include: collecting information from employees about their perspectives on **ONE NASA**; integrating that information with other data into a set of recommendations for action; and integrating the **ONE NASA** effort with other change initiatives.

We need your help in shaping **ONE NASA**. Find out more about **ONE NASA** and provide feedback by visiting www.onenasa.nasa.gov.

2002 IN REVIEW

JANUARY

New NASA Administrator

Newly sworn-in Sean O'Keefe made his first visit as NASA Administrator to Johnson Space Center.

FEBRUARY

E-Week

JSC engineers participated in Engineers Week, an annual event to raise awareness and interest in the profession. E-Week includes the annual Mars Settlement Design Competition.

White Sands

The White Sands Training Facility earned Star site status from OSHA's Voluntary Protection Program - a designation given to work sites that are safe and healthy beyond OSHA requirements.

Rodeo

The annual Houston Livestock Show and Rodeo drew its usual huge crowds in 2002: 40,000 visitors stopped by the NASA/JSC exhibit alone during the 20-day event.

MARCH

Hubble mission: STS-109

The STS-109 crew successfully completed the mission objective of servicing the Hubble Space Telescope.

Roy Estess returns to Stennis

Roy Estess, who served as Acting Director of JSC for more than a year, returned to his post as Director of Stennis Space Center in Mississippi.

APRIL

Howell becomes JSC's Ninth Director

Lt. Gen. Jefferson D. Howell, Jr. took over the reigns as Director of JSC. Howell had previously been the Senior Vice President and Program Manager for the Safety, Reliability and Quality Assurance contract at JSC and had been employed by Science Applications International Corporation.

Barbara Morgan

Barbara Morgan, a former schoolteacher, was named the Agency's first Educator Astronaut on April 12.

O'Keefe unveils future NASA vision

Administrator O'Keefe presented NASA's new vision and mission.

ISS construction mission: STS-110

The crew of STS-110 installed the 43-foot long S0 Truss - the backbone for future station expansion - to the ISS, and also prepared the first railroad in space, the Mobile Transporter, for use.

MAY

Photography breakthrough

NASA announced that astronaut photography of the Earth from the ISS had achieved a level of detail that allows scientists to use the photographs to study changes occurring in very small features on the Earth's surface. The results of the study were discussed in an article featured in the American Geophysical Union journal *Eos Transactions*.

JUNE

STS-111

STS-111 delivered the Expedition 5 crew to the station, delivered and installed the Mobile Base System and returned the Expedition 4 crew to Earth. The astronauts also replaced a wrist roll joint on the station's robotic arm, Canadarm2.

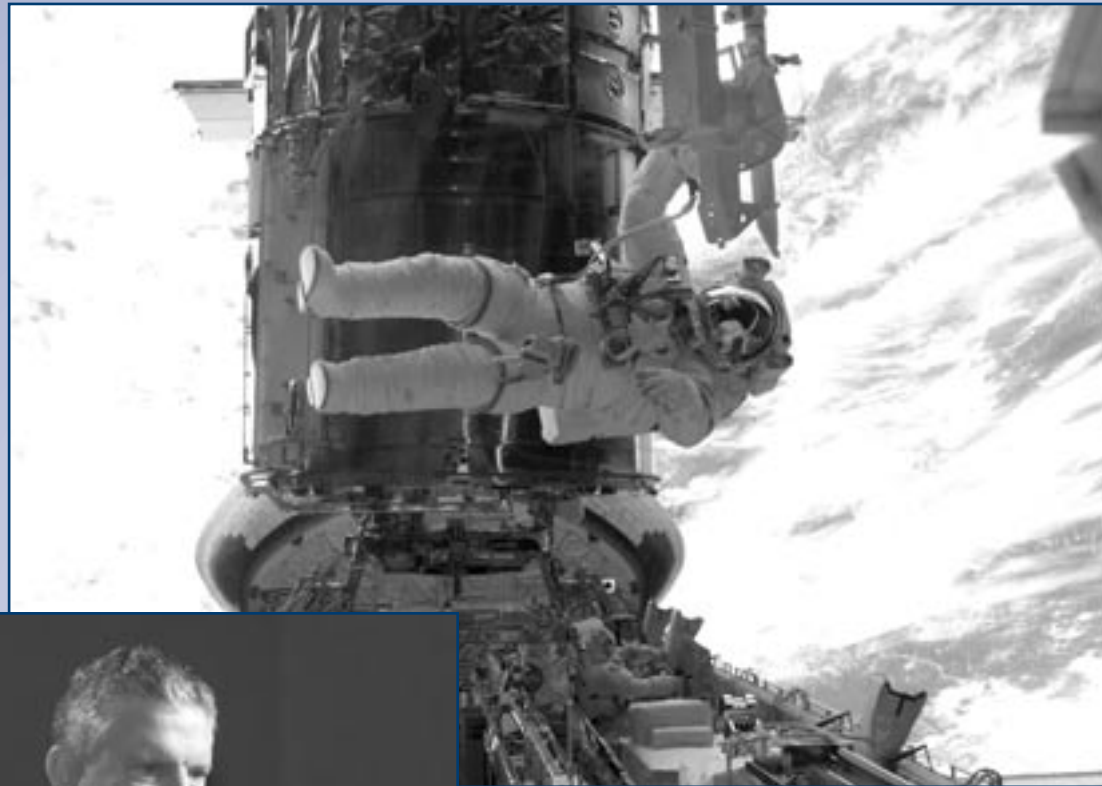
Expedition 4 crew returns

The Expedition 4 crew, consisting of Commander Yuri Onufrienko, Flight Engineer Dan Bursch and Flight Engineer Carl Walz, returned to Earth. During the crew's 196 days in space, Bursch and Walz broke the U.S. spaceflight endurance record. Astronaut Shannon Lucid held the previous record of 188 days.



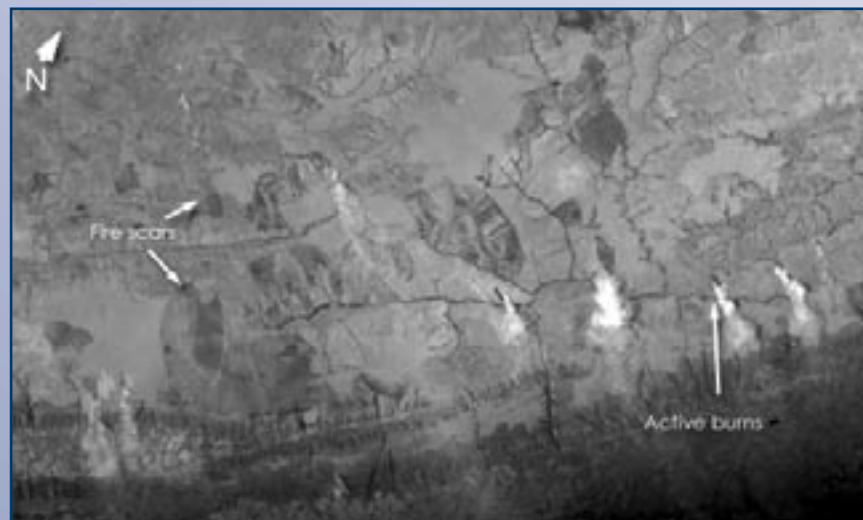
NASA JSC 2002e01976 Photo by James Blair

New NASA Administrator Sean O'Keefe was greeted by Robonaut during his January visit to JSC.



NASA JSC 2002e13694 Photo by Robert Markowitz

Lt. Gen. Jefferson D. Howell, Jr. addressed a JSC audience in April after having become the new Center Director.



NASA ISS004-E-11958

This image taken on May 16, 2002, shows fire scars and smoke plumes resulting from biomass burning in the savannas of southern Democratic Republic of Congo. ISS photography allows scientists to use photographs to study Earth changes.



NASA JSC 2002e13485 Photo by Robert Markowitz

Astronaut Barbara Morgan and NASA Administrator Sean O'Keefe took part in a press conference on April 16 at JSC following the April 12 announcement that Morgan would fly on a shuttle mission to the ISS. Morgan, NASA's first Educator Astronaut, has since been assigned to STS-118, which is slated for a November 2003 launch.

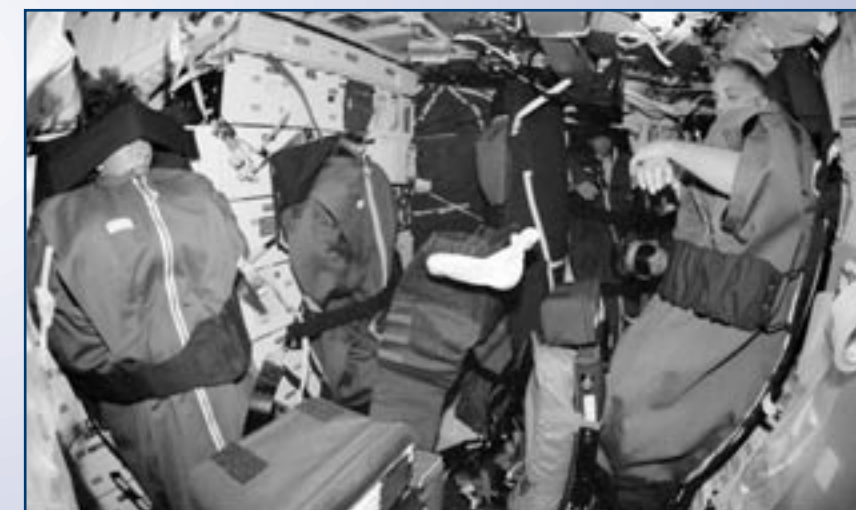
NASA STS113-E-05156

Astronaut John Herrington is ready to begin his Nov. 26 spacewalk to perform work on the ISS as part of STS-113.



NASA S109e5750

Astronaut John Grunsfeld, STS-109 payload commander, floats near the giant Hubble Space Telescope, temporarily hosted in the Space Shuttle *Columbia's* cargo bay. Astronaut Richard Linnehan (lower right), mission specialist, works in tandem with Grunsfeld during this fifth and final scheduled spacewalk on March 8, 2002.



NASA STS112-345-028

The STS-112 crewmembers slept on the middeck of Space Shuttle *Atlantis*. Pictured are Mission Specialists Sandra Magnus, David Wolf and Piers Sellers, and Commander Jeffrey S. Ashby.

The NASA vision is:

*To improve life here,
To extend life to there,
To find life beyond*

The NASA mission is:

*To understand and protect our home planet
To explore the Universe and search for life
To inspire the next generation of explorers
. . . as only NASA can*

JULY

Tommy Holloway Retires

Tommy Holloway, ISS Program Office Manager since 1999, retired July 3. He had been Space Shuttle Program Manager from 1995-1999 and began his career with NASA in 1963. Bill Gerstenmaier, who had been Deputy Manager of the ISS Program since December 2000, succeeded Holloway as the program's Manager.

AUGUST

OSHA VPP Star

Following an audit, JSC kept its status as an OSHA VPP Star site.

SEPTEMBER

Peggy Whitson

Peggy Whitson was named the first NASA ISS Science Officer on Sept. 16.

OCTOBER

Historical move of MCC

With the threat of Hurricane Lili, Mission Control Center employees worked around the clock on Oct. 1 and 2 to transfer control of the U.S. segment of the ISS to a NASA team stationed in Russia, and then to entirely power down the MCC. It was the first time such a transfer of control had occurred. Control of the U.S. segment returned to MCC Houston on the evening of Oct. 3.

World Space Congress

World Space Congress, a gathering of space experts, agencies and companies, was held in Houston Oct. 9 - 19. JSC's involvement in this once-per-decade event was extensive and included exhibits in the NASA Village and the coordination of Discover NASA Day, an event for Houston-area kids.

STS-112

The STS-112 crew installed and activated the S1 Truss and performed three spacewalks during the mission. The launch of STS-112 was seen in a new way: it was the first time that a camera was mounted on the shuttle's External Tank.

NOVEMBER

STS-113

STS-113 delivered the Expedition 6 crew to the ISS, delivered and activated the P1 Truss, and brought home the Expedition 5 crew.

John Herrington

Astronaut John Herrington, a Mission Specialist aboard STS-113, became the first Native American with an active tribal affiliation to fly in space.

DECEMBER

Expedition 5 crew returns

The Expedition 5 crew, consisting of Commander Valery Korzun, NASA ISS Science Officer Peggy Whitson and Flight Engineer Sergei Treschev, returned home.

George Abbey retires

Former JSC Director George Abbey retired, capping off a federal service career that spanned a half-century.

Expedition 5 Returns

Highlights:

- Launch: June 6, 2002 - with STS-111
- Landing: Dec. 7, 2002 - with STS-113
- Duration: 184 days, 22 hours, 14 minutes
- Crew: Commander Valery Korzun, NASA ISS Science Officer Peggy Whitson, Flight Engineer Sergei Treschev
- Elements added during mission: S1 Truss and P1 Truss
- Science experiments conducted: 25

Dr. Peggy Whitson, who has a doctorate in biochemistry from Rice University, became the station's first resident scientist when she arrived at the ISS June 7, 2002, as an Expedition 5 Flight Engineer. A few months later, Whitson was named NASA's first ISS Science Officer. In his Sept. 16 announcement, NASA Administrator Sean O'Keefe said Whitson was "an obvious choice" for the job.

“The people on the ground know about the station, and the children want to be cosmonauts, astronauts, to fly in space, and this is a dream...for them. And I think this is very important for a new human generation, to think about it and to have wishes to go in space.”

—Valery Korzun, from his preflight interview



NASA S113e05442

Astronaut Peggy Whitson, Expedition 5 NASA ISS science officer, looks at the ISS through a window on the Space Shuttle *Endeavour* following the undocking of the two spacecraft. *Endeavour* pulled away from the station on Dec. 2. The ISS had been Whitson's home for 184 days.



NASA ISS 005e17453

Expedition 5 Commander Valery Korzun, Science Officer Peggy Whitson and Flight Engineer Sergei Treschev are all smiles in the ISS.



NASA JSC ISS005-E-20302

Commander Valery Korzun checks a plant growth experiment in the Zvezda Service Module on the ISS.

Background image: NASA JSC 2002e51798
Photo by James Blair

Expedition 5 Science Officer Peggy Whitson, Flight Engineer Sergei Treschev and Commander Valery Korzun are welcomed home from their 184-day stay aboard the ISS.

Profiles

JSC engineer honored by Air Force

By Kylie Moritz

Royce Forman has been a leader in the field of structural integrity and safety of aircraft for more than 40 years.

In December, the United States Air Force Aircraft Structural Integrity Program (ASIP) recognized Forman's expertise. The award is in honor of a structural integrity and safety pioneer, John W. Lincoln, and is presented every year to a distinguished career expert who has made significant contributions toward advancements in aircraft structural integrity and safety.

"It was a surprise to receive the award," Forman said.

Forman's career began to excel at the Wright-Patterson Air Force Base in Ohio. There he investigated crack problems in Vietnam War aircraft. During those investigations he initiated the use of fracture mechanics to examine aircraft in the Air Force, studying the growth rate and the instability of crack defects. He also developed the universally known "Forman Equation" used in predicting the growth rate of fatigue cracks.

Forman then moved to Nassau Bay to work at Johnson Space Center in 1967. He is now the senior engineer overseeing fracture mechanics technology, testing and development at JSC. One of his biggest achievements was to initiate the development of a fracture control analysis software code.

He formed the NASA Fracture Control Methodology Panel and originated the Space Act Agreement between NASA and the Southwest Research Institute to develop the software. He now manages NASA's role in a 13-company consortium to maintain and upgrade the software program.

The software Forman developed is called NASGRO. It helps engineers analyze fatigue crack growth, as well as assess the structural life of materials and the effects of stress on the equipment. Many companies outside of NASA, as well as the United States Department of Defense and the Federal Aviation Administration, use the NASGRO software program.

As the JSC representative of the NASA Fracture Control Methodology Panel,

Forman also spearheaded the development and publication of NASA's fracture control requirements documents for space shuttle payloads and the International Space Station. He continues to contribute to the field of structural integrity by authoring papers and publications. As a result, much of his work is internationally recognized, included in technical books and taught in college courses.

For his dedicated efforts throughout the years, Forman has received a Silver Snoopy Award, numerous performance awards from NASA and a Man of the Year award from the Air Force Flight Dynamics Laboratory.

His most recent recognition from the Air Force was a true honor for Forman. "I attend the ASIP conference every year and personally know all of the six previous winners," he said. "There are a number of people that deserve the award, and I hoped that someday I would be honored."

More information about the award can be found at the ASIP Web site:
<http://www.asipcon.com/index.htm>



NASA JSC 2003e00584 Photo by Bill Stafford

Solar-powered refrigerator keeps things cool with the hot sun

By Joanne Hale

When JSC engineer Michael K. Ewert entered his design for a solar powered house in his sixth grade science fair he never dreamed he would some day be designing air conditioning systems for human habitat on the moon. But that is exactly how it turned out.

Ewert, who has been working on developing a cooling system for the moon since 1992, took his original design concept and applied it to a more down to earth application: solar powered refrigeration.

"I began looking at what people were doing on earth and became interested in solar refrigeration systems," said Ewert. "Technically it is the same type of cooling system but on a smaller scale."

As a result, Ewert was awarded his third patent since 2001 for his solar-powered refrigeration system. This latest patent focuses on the innovative control techniques that enable the refrigerator to run efficiently.

The solar refrigerator, a battery-free 4 cubic ft. design, is operated by a variable speed compressor, solar panel and thermal storage unit that work together to utilize the sun's energy and run the refrigerator with optimum efficiency.

"The refrigerator can run on as little as five hours of sun a day," said Ewert. "The control system matches the amount of sunshine to the compressor's speed so that it can run slow in the morning and speed up in the afternoon when the sun is most intense. During a stretch of cloudy days the refrigerator builds up thermal storage and can remain cold for up to a week."

SunDanze Refrigeration, Inc., founded by co-inventor David Bergeron, is currently selling the solar cooling system for \$1,150. Two dozen have sold to date and Ewert has high hopes for the refrigerator's future.

"The startup company is small but sales have continually increased," Ewert said. "I see the first potential use in the area of small business. It (solar refrigerator) could easily be used for such things as selling refreshments. Hopefully the price will come down and more people will be able to use it."

Ewert says he enjoys working on inventions that have worldwide implications, such as his solar refrigeration concept, because of the benefit that he can bring to people around the globe.

"It inspires me to work on technology knowing it has the potential to improve people's lives," Ewert said.

Ewert is hoping to promote his unique solar cooling technology to the automotive industry later this year. ♦



NASA JSC 2003e01555 Photo by Mark Sowa

Michael Ewert receives the Inventor Award from Sue Garman at the JSC Inventor's Luncheon

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